THE WOOD-SUPPLY SITUATION IN NEW YORK STATE

WITH SPECIAL REFERENCE TO WOOD FOR PULPING

by

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CONTENTS

	Page
Trends of paper and paperboard production	1
The sources of fibrous materials	3
Estimates of the wood-supply situation	5
Extent of the forest land	5
Character of the forest growth	7
Estimates of the timber volume in the existing stands	8
Current annual growth of the existing stands	10
Relationship of growth and drain	10
What can be done to obtain more adequate supplies of pulpwood?	11

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NORTHEASTERN FOREST EXPERIMENT STATION

Trends Of Paper And Paperboard Production

It would certainly be difficult to think of any subject more important to the paper and paperboard industry of New York State than "Conservation of Materials".

As a preliminary to discussing the wood-supply situation in New York State, we want to review briefly some general trends in the development of the pulp and paper industry in the State, and to show where the industry procured the fibrous materials that it consumed in 1947.

Of course it is a well-known fact that New York State leads all its sister States in the manufacture of paper and paperboard. Several other States are now close rivals, but so far they have not been able to capture the leading position. The total output of paper and paper-

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[1] Based on a paper presented before the Empire State Section, Technical Association of the Pulp and Paper Industry, at its meeting at Lake George, N. Y., on June 3, 1949.

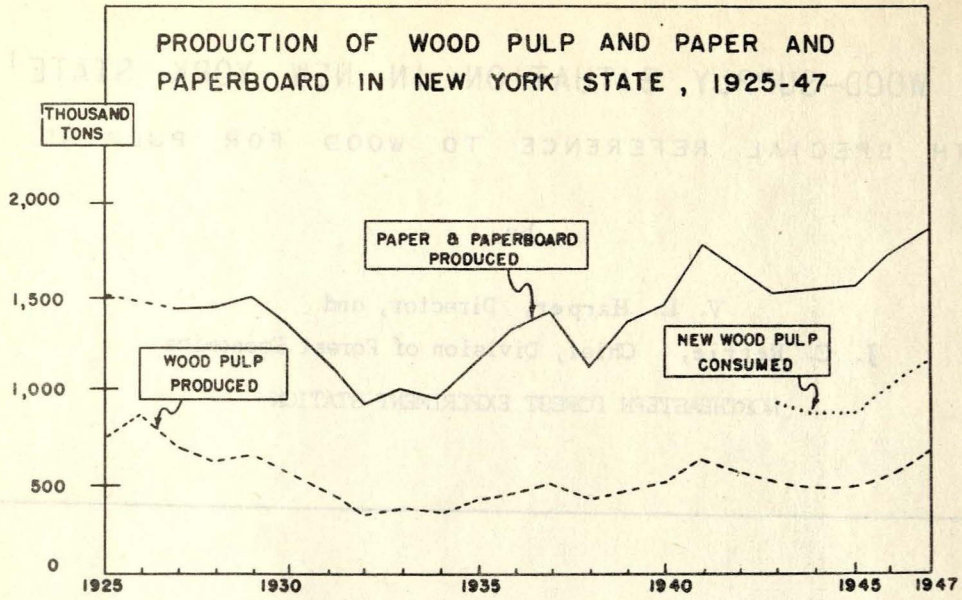

Figure 1.--Production of paper and paperboard is on the increase, wood pulp output lags far behind wood pulp consumption.

board by New York mills--except for the three depression years 1932-34--has been well above the 1-million-ton level. Since 1940 the output has been more than 1½ million tons annually. In 1947 it was 1,849,873 tons (fig. 1).

This is certainly a great achievement. However, it should not lead to any attitude of complacent satisfaction. Paper and paperboard can be made only from fibrous materials, and no industry can be any sounder than its basic source of raw materials.

In the production of wood pulp the position of leading State passed from New York to Maine about 1914. In 1928, Wisconsin also forged ahead of New York. Washington passed into this company in 1931. By 1939, Louisiana was also producing more wood pulp than was coming from the mills of New York.

The current production of the New York pulp mills is just under the 650,000-ton level, having declined from twice that amount of annual output in the decade prior to 1921. Not for many years has it been

possible for the output of New York's pulp mills to come within close range of the consumption of wood pulp by the paper and paperboard mills. The net deficit in recent years has been 400,000 to 500,000 tons--481,692 tons in 1947 (fig. 1). The actual wood-pulp deficit is somewhat more than this because a considerable tonnage of the pulp manufactured in New York State finds its way into nonpaper products, and thus some pulp is diverted from the paper mills.

The Sources Of Fibrous Material

But this wood-pulp deficit does not tell the whole story. For many years the New York pulp mills have been drawing heavily upon Canada for a substantial part of their pulpwood supply.

The New York State Division of Commerce has estimated that even as early as 1904 some 40 percent of the pulpwood consumed in New York came from Canada. In 1939, this same agency estimated, some 47 percent of the pulpwood consumed in New York came from Canada, and an additional 17 percent came from neighboring States. Home-produced pulpwood accounted for only 36 percent of the total consumption.[2]

The more recent situation with regard to the sources of fibrous materials consumed by the paper and paperboard mills is graphically illustrated in figure 2--based principally on Bureau of the Census information for 1947. That year a total of 2,002,346 tons of fibrous materials was used. Of this total, 1,127,647 tons were in the form of virgin wood pulp--composed of some 645,955 net tons that were made within New York State and 481,692 net tons that were brought in from other States and foreign countries.

Along with this virgin wood pulp, the mills used 874,699 tons of waste-paper pulp and nonwood fiber such as rags and straw.

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[2] New York State Division of Commerce. The Pulp and Paper Industries of New York State. p. 13. Albany. 1942.

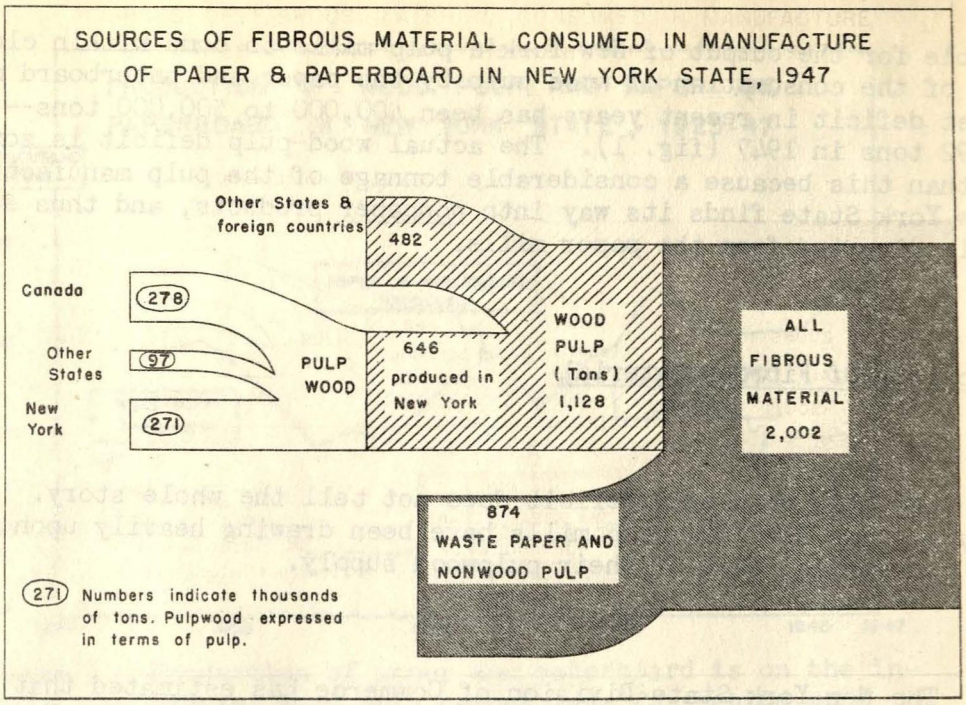

Figure 2.--Only a small part of the fibrous material comes from New York's forests.

The 646 thousand tons of wood pulp that were manufactured within New York State can be allocated roughly according to the sources of the pulpwood from which it was made. Unpublished information from the War Production Board indicates that in 1944 some 43 percent of the pulpwood received at New York pulp mills came from Canada. It seems rather unlikely that conditions changed very radically between 1944 and 1947. On the basis of this supposition, it is estimated that about 43 percent of the pulpwood consumed by the New York mills in 1947 came from Canada. It also seems safe to estimate that 15 percent of the pulpwood consumed came into New York from neighboring States--chiefly Vermont and New Hampshire. The remaining 42 percent of the pulpwood consumed was, very probably, about the volume drawn from New York's forests.

In terms of pulpwood volume, the wood used in the making of pulp in the mills in New York State in 1947 amounted to 884,025 cords. Of this, 380,000 came from Canada, 134,000 came from neighboring States, and 370,000 came from New York's own forests. The pulpwood equivalent of the manufactured pulp that was obtained from outside New York State would add up to about 665,000 cords--making the total pulpwood equivalent of all the wood pulp that was consumed in the making of paper and paperboard not less than 1,549,000 cords.

Balance this whopping figure against 370,000 cords that came out of New York's own forests and you can readily see that conservation of materials is a vital matter to the pulp and paper industries of the Empire State.

Estimates Of The Wood-Supply Situation

In considering New York's wood-supply situation, and especially the wood suitable for pulping, we are greatly handicapped by the lack of forest-survey information. This will not be the case a year or two hence because the Northeastern Forest Experiment Station (in cooperation with the State Department of Conservation) is now engaged in making a forest survey of the entire State. About 30 percent of the field work has been completed. Statistical reports for groups of counties on forest acreage, timber volumes, and on other aspects of the forest situation will be available before very long.

Meanwhile, the wood-supply situation in New York State can be described only by resorting to a set of estimates that were made by the Forest Service in 1945 as part of its Nation-wide "reappraisal" studies. These estimates, in States like New York, which has not yet been covered by the forest survey, are subject to a considerable margin of error. This should be kept in mind constantly when considering the figures we cite.

Extent Of The Forest Land

The total land area of New York State adds up to about 30.7 million acres. Of this, about 44 percent, or 13.5 million acres, is forest land. But of this total forest acreage, some 2.4 million acres--largely within the State Forest Preserves--are not available for commercial timber cutting. This leaves 11.1 million acres that can be classed as commercial forest land.

The distribution of this commercial forest acreage by principal types of ownership is about as follows:

	Million acres	Percent
Farm woodland	3.6	32
Other private	6.7	60
Total private	10.3	92
Public	.8	8
Grand total	11.1	100

The basic pattern is one of privately owned lands, with 32 percent of the total commercial acreage in farms and 60 percent in nonfarm private holdings. There are not many large industrial holdings like those that are common in northern New England, in the South, and in the West. The acreage held by pulp companies is relatively small--660,000 acres. Only four companies have holdings that exceed 100,000 acres. The bulk of the 800,000 acres of public commercial forest land is owned by the State--more than half in reforestation lands that are on the way to restored production of timber.

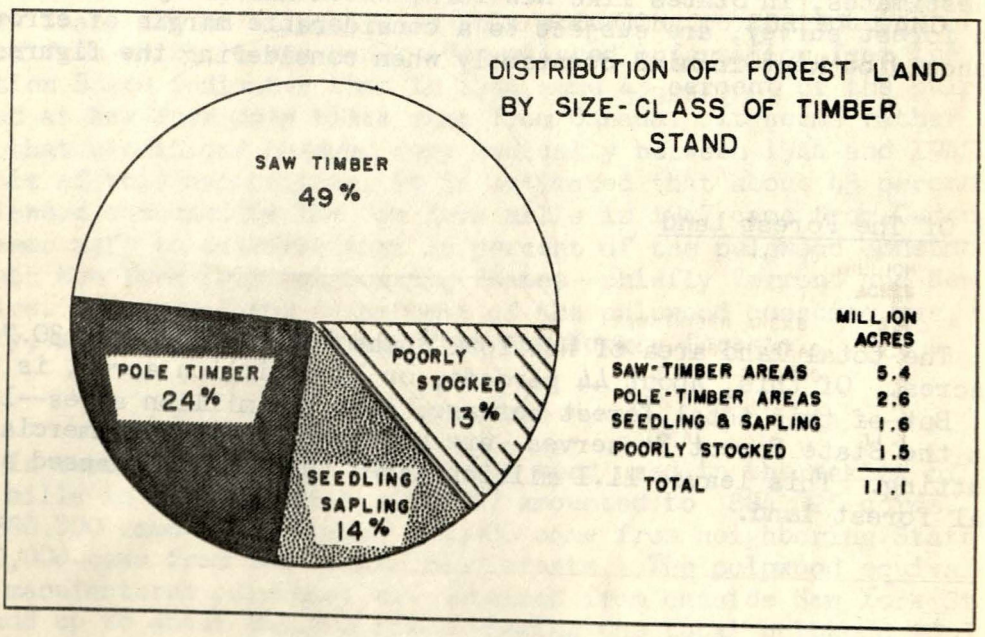

Figure 3.--About half the acreage is in young timber.

Character Of The Forest Growth

It is customary to classify forest lands according to the size of trees in the timber stands that they bear. To classify as a saw-timber stand, an area must have an average timber volume of at least 2,000 board feet per acre in softwood trees that are 9 inches or larger in diameter at breast height[3], and in hardwood trees that are 11 inches and larger. On the basis of this criterion, the saw-timber area in New York State adds up to about 5.4 million acres--slightly less than 49 percent of the total commercial forest acreage.

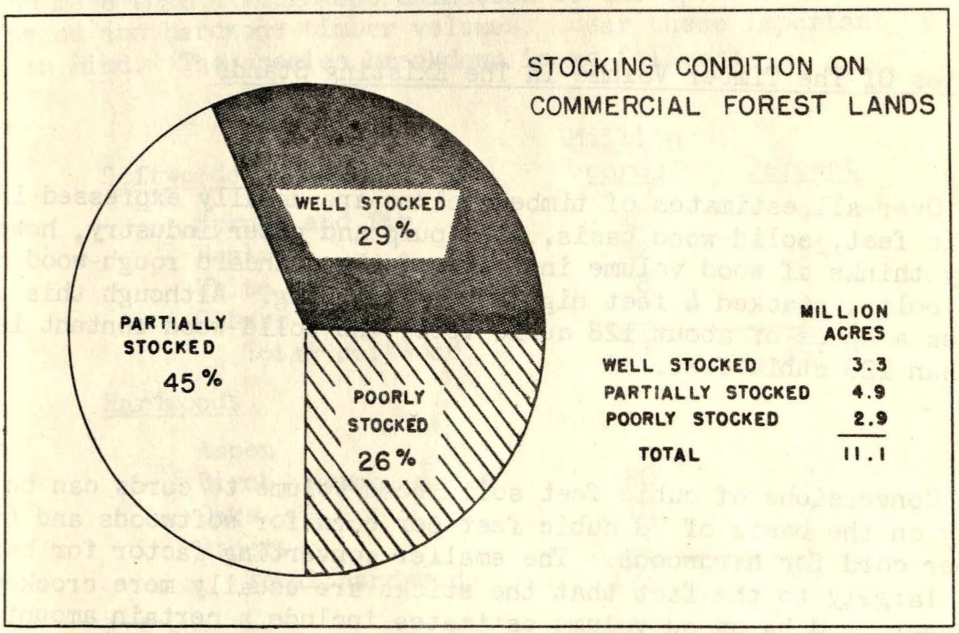

Figure 4.--Inadequate stocking is a critical problem.

Pole-timber stands are defined as those that have trees too small and in insufficient volume to classify as saw-timber. A minimum tree size of 5 inches diameter at breast height and a minimum volume of 2 cords per acre are the lower limits of the pole-timber classification. New York State has about 2.6 million acres that fall in this pole-timber category.

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[3]This measurement is taken $4\frac{1}{2}$ feet above average ground level.

Seedling and sapling stands occupy about 1.6 million acres of the commercial forest land. The remaining 1.5 million acres are in a poorly-stocked or denuded condition. The over-all picture is shown graphically in figure 3.

This classification of forest land by size of trees does not, of course, tell the whole story. The matter of stocking is highly important. Here the picture is a rather sad one (fig. 4). Only about 29 percent of the commercial forest land, regardless of the size of trees that it bears, is well stocked. About 45 percent is partially stocked. Some 26 percent is poorly stocked; hence it is at a very low level of productivity.

Estimates Of The Timber Volume In The Existing Stands

Over-all estimates of timber volume are usually expressed in terms of cubic feet, solid-wood basis. The pulp and paper industry, however, usually thinks of wood volume in terms of the standard rough-wood cord of 4-foot bolts, stacked 4 feet high and 8 feet long. Although this unit occupies a space of about 128 cubic feet, the solid-wood content is much less than 128 cubic feet.

Conversions of cubic feet solid wood volume to cords can be made roughly on the basis of 78 cubic feet per cord for softwoods and 65 cubic feet per cord for hardwoods. The smaller converting factor for hardwoods is due largely to the fact that the sticks are usually more crooked, knots are bigger, and hardwood volume estimates include a certain amount of limb wood.

The total volume of timber now standing on New York's commercial forest land adds up to about 140 million cords. Of this total, about 85 million cords are in trees of saw-timber size. About 55 million are in trees of pole-timber size.

Breaking this over-all estimate down still further, we find that there are about 33 million cords in the softwood species and 107 million in the hardwood or broadleaf species. There are, in other words, about 3 cords of hardwood to every cord of softwood.

Let us push the analysis still further and break down the softwood and hardwood volume into the principal species. This is important because present pulping equipment and technology can economically utilize only a limited number of species--particularly spruce and fir, hemlock, aspen, and limited quantities of white pine and of the dense hardwoods.

Volume estimates by principal species are available only for the timber of sawlog size. They have been derived largely from the statistics of lumber production; hence they probably do not give due weight to volume in some of the less-preferred species. It is also probable that the species composition of the existing pole-timber stands does not correspond exactly to that of the saw-timber stands. Therefore, these data can be no more than a rough approximation of the species distribution of the softwood and hardwood timber volumes. Bear these important qualifications in mind. The species breakdown is as follows:

	Million cords	Percent
Softwoods		
Spruce and fir	12	9
Hemlock	12	9
White and Norway pine	8	5
Others	1	1
Total softwood	33	24
Hardwoods		
Aspen	6	4
Birch, beech, maple	80	57
Oaks	10	7
Others	11	8
Total hardwoods	107	76
All species	140	100

If the species distribution obtained by this method is even within shooting distance of the true facts, as we believe it probably is, the growing stock in those species that are preferred for pulping is far below what it should be to meet the needs of New York State's pulp and paper industry. A growing stock of 30 million cords of spruce and fir, hemlock, and aspen is far too little to satisfy the needs of an industry that is annually consuming 700,000 cords of pulpwood and could probably use 500,000 to 600,000 cords more if it were available.

Current Annual Growth Of The Existing Stands

Estimates of current annual timber growth made in connection with the Forest Service's reappraisal studies indicated that the net annual growth in the softwood species amounts to about 1.1 million cords, of which 500,000 cords are in trees of saw-timber size and 600,000 are in trees of pole-timber size. The net annual growth in the hardwood species amounts to 4.7 million cords, of which 2.6 million is in saw-timber trees and 2.1 million is in pole-timber trees.

Translated into terms of percentage increase of present growing stock, the softwood growth represents a rate of 3.3 percent per year. The corresponding rate for the hardwood growing stock is 4.4 percent per year. These rates are reasonably good. The chief reason for their failure to yield the volume of wood that is needed traces back to scarcity of adequate growing stock--in other words, to the run-down condition of the forests.

Furthermore, the growth is heavily weighted by hardwoods--4.7 million cords as against 1.1 million cords of softwood. This also is due in large part to cutting practices that have allowed hardwoods to take over large areas that formerly bore mixed stands of hardwoods and softwoods. This, of course, is usually due to poor forest management. And it is highly detrimental to the long-term interests of the pulp and paper industry, which needs all it can get of the softwood species--particularly spruce and fir and hemlock.

Relationship Of Growth And Drain

There is a tendency in many discussions of the forestry problem to put too much emphasis on the growth-drain relationship and to draw comforting inferences whenever it can be shown that the over-all growth exceeds the total drain. The significant question is not whether the total growth exceeds total drain--important as that relation may be--but whether the forest lands are growing timber at a rate reasonably commensurate with their productive capabilities, and whether such timber is of the species, size, and quality needed by the dependent wood-using industries.

Softwood saw timber usually has a broad range of commercial uses and for that reason it is under heavy pressure. Forests that still show an unfavorable balance of growth and drain in softwood saw timber are not in a condition that can give much assurance to the pulp and paper industry. While it is true that the pulp industry can utilize trees of less than saw-timber size, it is not very economical to do so. About 60 percent of the pulpwood cut in New York in 1944 came from trees of saw-timber size.

The situation in New York State is by no means the poorest that can be found in the United States, or even in the Northeast. The over-all timber growth does exceed total drain by a substantial margin.

However, for the most critical product, the softwood timber of sawlog size, the commodity drain alone exceeds the current growth by 28 percent. And this does not count additional losses from fire, insects, and tree diseases.

Here is the condition that spells continuing forest decadence even while total timber volume is on the increase. Careful analysis of the estimates that are available indicates that if there is any net increment in total softwood volume at all--including trees of pole-timber size, and taking into account the fire, insect, and disease losses--it certainly cannot be very large. Less than 20 percent of the current growth is in the softwood species (fig. 5). There are as yet virtually no indications that softwood growing stock is building up to meet future needs.

The substantial surplus of hardwood growth over the present commodity drain is large enough to sustain the losses to fire and pests and still give a sizable net increment in volume. It seems pretty clear that New York's pulp industry is going to be compelled to turn more strongly to hardwoods. The pressure in this direction will increase notably as the Province of Ontario implements its recently announced policy of reducing the export of pulpwood cut from Crown lands by 10 percent per year.

What Can Be Done To Obtain More Adequate Supplies Of Pulpwood?

The question of what can be done to obtain more adequate supplies of pulpwood for the mills of New York State is one for which there is no easy answer. Increased utilization of hardwoods has just been mentioned,

but it is no panacea. With present papermaking technology and without drastic changes in mill equipment, the volume of hardwood that can economically be used will increase gradually--barring, of course, some revolutionary new discovery. But even in that event, the supplies of hardwood timber are not unlimited. They would soon go the way of the softwwods if they were not put under forest management.

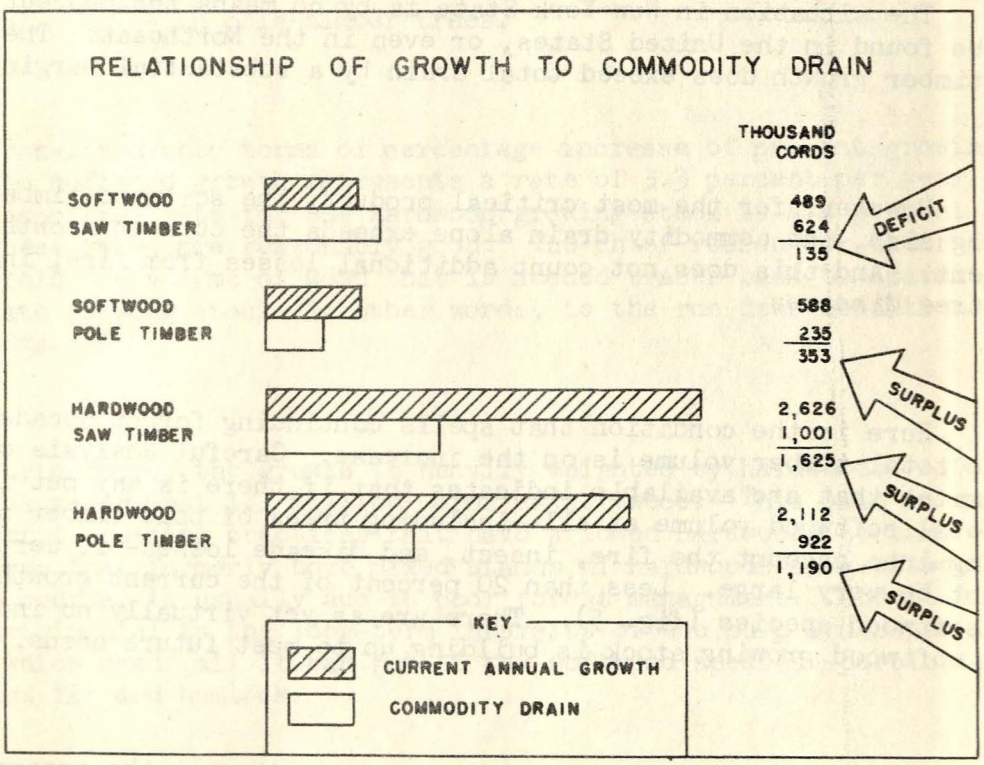

Figure 5.--The bulk of the current growth is in the hardwoods.

The second avenue of attack is, of course, an intensification and expansion of the present forestry program administered by the State Department of Conservation. This provides, among other things, for on-the-ground advice and technical help for the small woodland owner in the management of his forest property and in the marketing of his forest products. The cooperative State-Federal program of forest protection is reasonably effective. Further planting of abandoned farm land to restore it to forest production, along with a greatly expanded program of cultural work on existing plantations, is highly desirable.

As a third and most important line of attack on the pulpwood-supply problem, we want to propose that the pulp and paper industry of New York State consider some bold steps that would take it into the business of growing more of its own timber. This has been the trend elsewhere.

What has been the cost of inadequate local pulpwood supplies over the past 50 years? There is no way that we can get a precise answer to such a question, but some simple arithmetic will provide an approximate answer. The State Division of Commerce estimated that the average price of pulpwood delivered at the New York mills in 1939 was about $3 per cord higher than the corresponding price at competing mills in the State of Maine. This unfavorable differential in the cost of wood at New York mills was likewise recognized in the administration of war-time price controls. It is a long-term handicap that originates partly in the scarcity of local pulpwood supplies and partly in the heavy rail transportation cost that must be paid on wood shipped in from Canada and from neighboring States. It is likely to grow even more serious as time goes on. A $3 per cord differential on the 700,000 cords of pulpwood that were consumed in 1939 amounts to more than $2 million. Thirty years ago the per-cord differential may have been much less, but the mills were consuming twice as much wood.

It is, therefore, not beyond reason to estimate that the policy of depending on out-of-state sources of pulpwood, over the past 50 years, has cost the New York State pulp industry between $50 and $100 million in added transportation and other charges. While this sum is not a big one in comparison with the total raw material costs over the period, it is sufficient to have paid for a large acreage of forest lands and for some rather intensive forest management on them.

"But," one might say, "that is water over the dam. The money is spent and gone. What can be done now?"

Yes, the money has been spent. But that is no reason for not recognizing that timber is a crop and for not launching into the business of growing it. Dependency upon distant sources of pulpwood supply has brought the industry face to face with the dismal situation described above. A continuation of this policy offers no hope of more favorable conditions. Why not turn to more aggressive forestry as the logical solution? It cannot provide the needed wood supplies next year nor the year after, but in a relatively few years it can begin to show results. And in the long run it could assure a permanent raw material foundation for the pulp industry.

Under moderately intensive forest management, New York's forest lands are capable of fairly high rates of timber production. The entire wood requirements of the State's pulp and paper industry could probably be grown, on an eventual sustained yield basis, on 2 million acres of forest land. This is less than 20 percent of the total commercial forest area. The technical know-how of forest management is no more difficult to acquire than the technology of pulp and paper making. A splendid State College of Forestry is already available to train the technical foresters that would be needed.

The total acreage held by the pulp industry, as previously mentioned, adds up to about 662,000 acres. In 1944 about 25 percent of the pulpwood consumed by the New York State pulp mills came from company-owned forest lands within the State. The present situation is probably not radically changed from that which prevailed 5 years ago. If the pulp industry should adopt the policy of growing at least half of the pulpwood that it consumed, it could probably do so before many years--first by intensifying the forest practices on the lands that it now owns, and second, by acquiring additional lands that would increase total forest holdings up to a level somewhere between 1 and 1½ million acres. The rest of the wood supply, logically, might be obtained from lands not company-owned. This would be highly desirable in order to provide assured markets for timber from thinnings and other improvement cuttings.

The pulpwood-supply problem of New York State's pulp industry can be solved. Why not tackle it with real determination? This is no time for defeatism or faint courage. Our country needs this great industry. The people of New York need it. Most of all, the industry needs to drive off the spectre that has been haunting it for these many years--raw-material starvation.

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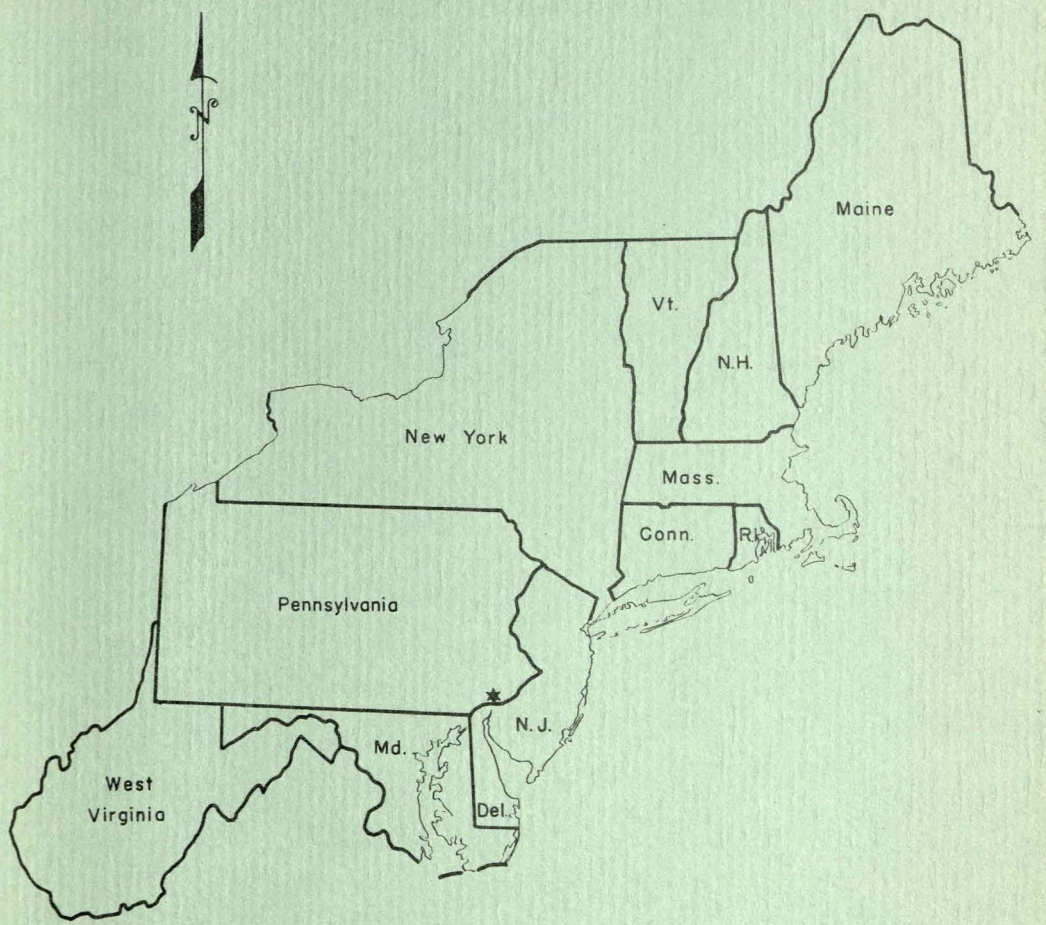

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